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SUMMARY

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Byelorussian SSR

METHODS FOR THE RECLAMATION OF SWAMPS

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1. At the end of the forties, the author and N.F. Lebedevich then working at the Minsk Experimental Station for Swamp Reclamation established for the first time that under certain conditions the reduction of the ground waters in swamps by 1.5-2 times in comparison with the routine norms of reclamation does not effect the crop output of agricultural products as was believed earlier, but on the contrary, considerably increases the crop of cultures. The theoretical interpretation of this fact was developed in 1951.

2. Owing to the major importance of these phenomena the experiments involved with the norms for reclamation works were being carried out until recently at the Minsk Station. Under the effect of vertical drainage /with mechanical scavenging of water/ and with the aid of a reclamation network conditions for a most varied water regime have been established. Hence, the author and his co-workers were fortunate enough to be the only group of scientists which had the possibility to investigate the norms of swamp reclamation within a vast range of 60-120 up to 350-450 cm. This rare possibility is the sole case in world experience of practical reclamation and certainly reveals ample material of theoretical and practical interest.

3. The generalization of experimental work carried out in the course of 16 years at the Minsk Swamp Station and the review of other studies in this narrow field led to the conclusion that the reclamation norms recommended in several countries i.e. 85-100 cm. for these under plough, 70-80 cm. for grain cultures and 60-70 cm. for meadow grasses viewed as optimum turned out to be not the optimum figures, but the minimum indices. These figures fail to create the optimum conditions of the air regime in peat soil and do not provide for a steady and stable water regime in the reclaimed swamp area.

4. On the basis of multiannual data the authors have established the following reclamation norms /in cm./ for the low land swamps with a peat depth none less than 60-80 cm. under conditions of a steady water regime in the zones of adequate moistening:

Culture	The Pre-sowing period	Vegetative period			The Pre-Spring period
		Optimum	minimum	maximum	
Ploughing and grain	none less than 60	120-130	none less than 100	220-260	130-150
Technical /hemp/	none less than 60-70	120-130	none less 100-110	220-260	130-150

The optimum figures are regarded for the vegetative period and the minimum for the pre-sowing and the pre-spring periods are accepted as the basis for calculation. Now, as to the minimum and maximum for the vegetative period they are introduced only for individual cases when it was permissible to use them /owing to natural conditions/ as exceptions.

5. The optimum reclamation norm of 120-130 cm. corresponds to the most favourable air regime in the peat soil /the minimum content of carbon dioxide, maximum content of oxygen in the soil air and most favourable gas exchange/. With the purpose of creating optimum humidity in the zones of inadequate and nonsteady dampness and in cases of high harvest yields, especially in regard to moisture-loving cultures and in the zones of adequate humidity, it is expedient to practice sprinkling irrigation or proper surface

irrigation and not to take to sluices, for the latter hinders and inhibits the air regime of the soil.

6. In the course of swamp reclamation works one should try to create a steady water regime with a standardized deep reduction of the ground waters. For this purpose, during the pre-spring period, the ground waters should be lowered to such a depth which is adequate for the creation of a reservation capacity in the reclaimed layer which would be able to take in the water formed following the snow thawing and the water masses from the spring rains and would yet leave some extra space. It is also important to see that the ground waters should be reduced to an average /for the vegetative period/ of 120-130 cm. and during the pre-sowing period it should amount to at least 60-70 cm.

Now, as for the mean conditions in the Byelorussian SSR the value of the pre-spring reduction of the ground waters amounts to 130-150 cm. For other conditions it can be calculated in accordance with the author's equation cited in his communication.

7. The standardized deep reduction of the ground waters in the swamps reveals the following positive features :

a/ owing to the high rate moisture capacity of peat the deeply reclaimed swamp turns into a peculiar ground resevoir which incorporates snow melt water and rain waters and, thus regulates the ground waters. This enables high crops to be produced irrespective of the weather conditions during any year abundant with water;

b/ the aqueous and aerial regime established in the soil permits to increase the soil fertility and to develop a maximum mobilization of the nutritional substances from peat;

c/ owing to the deep-set reduction of the ground waters the discharge of water shows an abrupt reduction /transpiration and soil evaporation/.

8. The study of swamp reclamation in the area of specially developed experimental sites with different natural conditions led to the following conclusions :

a/ the low-country nonflooded swamps with a bedding revealing poorly pronounced watertight properties by the ground/ clayey soil, clay/ should be reclaimed systematically with clay drainage or some other type of tubulated drainage with a drain distance of 25-40 m. depending upon the natural conditions.

b/ the area of lowland swamps with a weakly pronounced ground feeding bedded with sand is strongly influenced by the deep channels which protrude into the sandy subsoil and have a reclaimed effect. In these instances a systematic drainage with a small distance between the drains is not required.

For the purpose of reclaiming similar swamps the author has suggested his own reclamation system and now some testing is in progress. The basis of technique is as follows : single drains placed at a distance of 100-150 m. with a depth of 1.4-1.7 m.; the drains are locked and have a depth of 2.5-3.0 m.; the open channels are laid at a distance of 600-1000 m.

c/ in order to preserve the clayey drainage from being overrun by silt in the sites of the thinly bedded swamps with underlying sands, it is necessary to introduce a peat layer 3-5 cm. thick onto the bottom of the drainage trench hidden in the sand; the latter should be first charged with a peat layer of 20-30 cm. and later on by the excavated ground.

d/ the clayey drainage can be introduced without any framing in the area of swamps which had experienced preliminary reclamation even when the peat bedding is rather high; however, the depth of the peat bedding should proceed at a uniform level.

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